FORUM

Horticultural Research: It's a Growing Process

Walk down the produce aisle in almost any grocery store in the country and you'll find a diversity and an abundance of fruits, vegetables, nuts, and even flowers that rivals the fabled magic cornucopia. Stores stock this bounty because consumers want and buy more produce each year.

Consumer demand for horticultural crops has made them one of the fastest growing segments of U.S. agriculture. This crop group, which includes nursery and floral crops and turfgrass, is now the country's third most important commodity group. Grower receipts for horticultural products have been increasing at a rate of $500 million annually.

What is fueling this demand?

For one thing, Americans are more health conscious. Our knowledge of the importance and role of fruits and vegetables in maintaining health is becoming much more specific. Discoveries like ARS' work with high-antioxidant fruits and vegetables—found to prevent and even restore some loss of nerve function in aging rats—are helping focus attention on the specifics of optimum diet.

The economic boom of the 1990s brought a higher standard of living for many people. With more disposable income, people are spending more money at the grocery store on a wider variety of fresh produce. Sales of floral and nursery crops have similarly increased.

In addition, the ethnic diversity of the U.S. population is expanding at a prodigious rate. This increase in diversity, along with the growth of global trade, has introduced Americans to a plethora of exotic produce and ornamentals.

With exposure, U.S. consumers have become more adventurous in trying unusual horticultural products. Fifty years ago, fresh pineapples were rare in mainstream supermarkets; 25 years ago, mangos and papayas were uncommon; today, these fruits are regular offerings, along with starfruit, jicama, and plaintains. And orchids are commonplace at garden centers.

So where does horticulture go from here? Research is moving in a number of important new directions, besides pursuing traditional avenues such as increasing pest and disease resistance and improving growing techniques.

As consumer demand pushes exotic produce from a niche market to everyday fare, scientists are working on ways to grow many of these crops domestically. Researchers are also developing ways to extend the shelf life of horticultural produce.

U.S. consumers have become accustomed to having access to fresh fruits and vegetables all year. The ability to store produce longer means a U.S. crop can be used over a longer period or an imported shipment can come from farther away—including from areas where the harvest season differs from that in the United States.

Enhanced nutrition is also receiving new emphasis. ARS researchers are breeding for specific nutritional traits, such as enhanced carotenoid content, mineral composition, and other health-promoting compounds. This issue of *Agricultural Research* features work in Poplarville, Mississippi, where scientists are developing berries with higher levels of resveratrol, a compound that has anticancer properties and cardiovascular benefits (p. 10).

Food safety issues, especially pesticide residues and bacterial contamination, are another priority for horticultural research. Consumers are not only demanding greater variety in flavor, color, and access, they also want to know that the food they buy, including horticultural crops, is completely safe. ARS researchers are developing baseline information needed to develop plans for Hazard Analysis Critical Control Points (HACCP) for many crops and processing plants.

Safety of products from the genetic engineering of horticultural crops is also of greater concern. ARS is doing more risk assessment to help ensure that gene-altered crops are safe for people and the environment. The agency is committed to rigorous safety testing before a variety or technology is released to the public.

Biotechnology is critical to research and its ability to meet consumer and industry demands. With new genetic technologies, the time required to develop a new variety can potentially be cut in half. Scientists can pinpoint the genes that control desired traits, and these genes can be efficiently transferred into new varieties using direct gene transfer technology or conventional breeding methodology.

But ARS researchers are not simply concerned with inserting new genes. They wish to manipulate how and when the new genes function. From control of plum pox virus and other disease-causing pathogens to extended shelf life, ARS scientists are using genetic engineering to improve horticultural crops in many ways. The story on page 14 focuses on the research of ARS plant physiologist Autar K. Mattoo, in Beltsville, Maryland. He is working to improve the shelf life and quality of tomatoes.

As research makes horticultural crops more nutritious, safer, tastier, more convenient to ship, and easier to store, consumer interest and demand will continue to grow. As consumer demand increases, research will be called on to provide even more improvements. It's a growing process.

John R. Stommel
Acting National Program Leader
Horticulture and Sugar Crops
Beltsville, Maryland